

In the claims:

1. (Currently Amended) A Method for the plasma-based generation of X-radiation, with the steps:

~~provision of providing a target material (50) in the form of a free flow structural formation (51) in a vacuum chamber (20), and irradiation of the target material (50) in order to produce a plasma condition in which the X-radiation is radiated therefrom,~~

~~characterized, in that~~ wherein the flow structural formation (51) is formed in such a way that the target material, at least at a location of irradiation, has a surface (52) with a local curvature minimum, and irradiating the target material in order to produce a plasma condition in which the X-radiation is radiated therefrom.

2. (Currently Amended) The Method according to Claim 1 in which the flow structural formation (51) has, at least at the location of the irradiation, a cross-sectional surface having in a main axis direction (y) a longitudinal expansion Δy that is larger than a transverse expansion Δx in an auxiliary axis direction (x) deviating from the main axis direction (y).

3. (Currently Amended) The Method according to Claim 2 in which the flow structural formation (51) has, at least at the location of the irradiation, an oval cross-sectional surface or a rounded-off, rectangular cross-sectional surface.

4. (Currently Amended) The Mmethod according to ~~Claims~~ claim 2 or 3 in which the flow structural formation ~~(51)~~ forms, at least at the location of the irradiation, a free lamella-type sheet.

5. (Currently Amended) The Mmethod according to ~~Claims 3 or 4~~ claim 2 in which the flow structural formation ~~(51)~~ has, at least at the location of the irradiation, a concave surface at least on one side.

6. (Currently Amended) The Mmethod according to ~~at least one of the preceding Claims~~ claim 1 where the flow structural formation ~~(51)~~ of the target material is produced with a target source which has a nozzle with a non-circular outlet opening ~~(14)~~.

7. (Currently Amended) The Mmethod according to ~~Claim~~ 6 where the flow structural formation ~~(51)~~ of the target material is produced with a dispenser which has a nozzle with a slot-shaped outlet opening ~~(14)~~.

8. (Currently Amended) The Mmethod according to ~~Claims~~ claim 6 or 7 where the nozzle for setting a predetermined alignment relative to the direction of the irradiation of the target material ~~(50)~~ is rotated.

9. (Currently Amended) The Mmethod according to ~~at least one of the preceding Claims 1 to 4~~ claim 1 in which the flow structural formation ~~(51)~~ of the target material is produced with two primary jets which are led together for the formation of a free self-supporting liquid sheet at a predetermined angle.

10. (Currently Amended) The Mmethod according to Eclaim 9 in which the primary jets are led together at an angle that is smaller than or equal to 180° .

11. (Currently Amended) The Mmethod according to Eclaim 9 in which the primary jets are led together at an angle that is smaller than or equal to 90° .

12. (Currently Amended) The Mmethod according to ~~at least one of the preceding Claims~~ claim 1 in which the flow structural formation ~~(51)~~ of the target material is irradiated essentially perpendicular onto the surface ~~(52)~~ with the local curvature minimum.

13. (Currently Amended) The Mmethod according to ~~at least one of the preceding Claims~~ claim 1 in which ~~one of the following materials is used as~~ target material is selected from the group consisting of: at least one hydrocarbon compound comprising at least one polymer, which is liquid at ambient temperature, water, glycerine, alcohol, liquefied gas and ~~or~~ liquid metal.

14. (Currently Amended) The Mmethod according to Eclaim 13 in which the hydrocarbon compound used as target material has at least one ether binding between carbon atoms.

15. (Currently Amended) The Mmethod according to Eclaim 14 in which the hydrocarbon compound used as target material has at least one partially fluorinated or perfluorinated polymer hydrocarbon ether.

16. (Currently Amended) The Mmethod according to ~~E~~claim 15 in which the hydrocarbon compound used as a target material has a perfluoropolyether or a mixture of perfluoropolyethers.

17. (Currently Amended) The Mmethod according to ~~at least one of the Claims 13 to 16~~ claim 13 in which the hydrocarbon compound used as target material has a vapor pressure at ambient temperature less than 10 mbar, a molecular weight larger than 100 g/mol and/or a viscosity in the range of 1 cS to 1800 cS.

18. (Currently Amended) The Mmethod according to ~~one of the preceding Claims 13 to 17,~~ claim 13, in which the irradiation of the target material ~~(50)~~ takes place in a vacuum chamber ~~(20)~~ which is at least locally heated in such a way that the vapor pressure of the target material ~~(50)~~ is higher than the pressure of the gas, which is released by the irradiation of the target material ~~(50)~~.

19. (Currently Amended) The Mmethod according to ~~one of the preceding Claims~~ claim 13 ~~to 18~~ in which target material ~~(50)~~, after irradiation, is collected in a collection device ~~(40)~~ equipment at ambient temperature.

20. (Currently Amended) ~~Usage~~ A method of using polymer hydrocarbon compounds, which are liquid at ambient pressure, for the provision of target material in the form of a flow structural formation ~~(51)~~, the target material having, at least at the location of a irradiation for the generation of soft X-radiation, a surface with a local curvature minimum.

21. (Currently Amended) Usage A method of using partially fluorinated or perfluorinated polymer hydrocarbon ethers for the provision of target material in the form of a flow structural formation ~~(51)~~, the target material having, at least at the location of a irradiation for the generation of soft X-radiation, a surface with a local curvature minimum.

22. (Currently Amended) An X-ray source for plasma-based generation of X-radiation by means of high-energetic irradiation of a target material ~~(50)~~ in the form of a free flow structural formation ~~(51)~~, comprising:

- a target source ~~(10)~~ that provides the target material ~~(50)~~ in a vacuum chamber ~~(20)~~, and

- ~~- an irradiation device (30) for irradiation the target material (50) in the vacuum chamber,~~

~~characterized, in that~~ wherein the target source is adapted for forming the target material in such a way that the target material in the flow structural formation ~~(51)~~ has, at least at the location of the irradiation, a surface with a local curvature minimum, and

- an irradiation equipment for irradiation the target material in the vacuum chamber.

23. (Currently Amended) The X-ray source according to Claim 22 in which the target source has a nozzle ~~(13)~~ with a non-circular outlet opening ~~(14)~~.

24. (Currently Amended) The X-ray source according to Claim 23 in which the target source has a nozzle ~~(13)~~ with a slot-shaped outlet opening ~~(14)~~.

25. (Currently Amended) The X-ray source according to Claim 24 in which the target source has a nozzle ~~(13)~~ with an outlet opening ~~(14)~~ which is elliptic, rectangular, or convex and tapered towards the inside.

26. (Currently Amended) The X-ray source according to Claim 24 in which the nozzle ~~(13)~~ has an outlet opening ~~(14)~~ with a nozzle slot ~~(14a)~~ and a conical opening ~~(14b)~~.

27. (Currently Amended) The X-ray source according to ~~at least one of the Claims~~ claim 23 ~~to 26~~ in which the nozzle ~~(13)~~ in the vacuum chamber ~~(20)~~ is arranged in a rotary manner.

28. (Currently Amended) The X-ray source according to Claim 22 in which the target source has two nozzles ~~(15, 16)~~ for the production of primary jets, which are led together for the formation of a free self-supporting liquid sheet ~~(51)~~ at a predetermined angle.

29. (Currently Amended) The X-ray source according to Claim 28 in which the nozzles ~~(15, 16)~~ are aligned in such a way that the primary jets are led together at an angle of 180°.

30. (Currently Amended) The X-ray source according to Claim 28 in which the nozzles ~~(15, 16)~~ are aligned in such a way that the primary jets are led together at an angle that is smaller than or equal to 90°.

31. (Currently Amended) The X-ray source according to ~~at least one of the Claims~~ claim 22 ~~to 30~~ in which at least

one heating ~~device~~ ~~(60)~~ equipment is ~~provided~~ envisaged with which at least parts of the vacuum chamber ~~(20)~~ can be tempered.

32. (Currently Amended) The X-ray source according to Claim 31 in which the heating ~~device~~ ~~(60)~~ equipment comprises several thermostats ~~(61-64)~~, which are connected with components at and/or in the vacuum chamber ~~(20)~~.

33. (Currently Amended) The X-ray source according to Claim 32 in which the irradiation ~~device~~ equipment has an irradiation optical system, which is arranged in the vacuum chamber ~~(20)~~ and is connected to a thermostat ~~(63)~~.

34. (Currently Amended) The X-ray source according to ~~at least one of the Claims~~ claim 22 ~~to 32~~ in which the irradiation ~~device~~ equipment has an irradiation optical system which is arranged outside of the vacuum chamber ~~(20)~~.

35. (Currently Amended) The X-ray source according to ~~at least one of the Claims~~ 22 ~~to 34~~ in which a collection ~~device~~ ~~(40)~~ equipment is ~~provided~~ envisaged for collecting the target material ~~(50)~~ after irradiation and is set up for the coolant-free operation.

36. (Currently Amended) The X-ray source according to ~~at least one of the Claims~~ claim 22 ~~to 35~~ in which an X-ray lithography device ~~(70)~~ is arranged in the vacuum chamber ~~(20)~~.

37. (Currently Amended) The X-ray source according to Claim 36, in which the X-ray lithography device ~~(70)~~ is connected with a thermostat ~~(64)~~.

38. (Currently Amended) The X-ray source according to ~~at least one of the Claims 22 to 37,~~ claim 22, in which the vacuum chamber ~~(20)~~ is joined to a processing chamber ~~(26)~~ in which an X-ray lithography device ~~(70)~~ is arranged.

39. (Currently Amended) A Vvacuum chamber with a nozzle ~~(13)~~ with a slot-shaped outlet opening ~~(14)~~ for injecting liquid target material into the vacuum chamber.

40. (Currently Amended) The Vvacuum chamber according to Claim 39 in which the nozzle ~~(13)~~ is arranged in a rotating manner around an axis that runs parallel to the direction of the injection of the liquid target material.

41. (Currently Amended) A Mmethod for the injection of a liquid target material ~~(50)~~ in the form of a free flow structural formation ~~(51)~~ into a vacuum chamber ~~(20)~~, comprising the step of:

characterized, in that

forming the flow structural formation ~~(51)~~ ~~is formed in~~ such ~~a way~~ that the target material has a surface ~~(52)~~ with a local curvature minimum.

42. (Currently Amended) The Mmethod according to Claim 41 in which the flow structural formation ~~(51)~~ forms a free, lamella-shaped sheet.

43.(Currently Amended) The ~~M~~method according to ~~C~~claim 41
~~or~~ 42 in which the flow structural formation ~~(51)~~ has a
concave surface ~~(52)~~ at least on one side.